

4.4 Building Functions Unit 4 Cluster 4

Combining functions using arithmetic operations F.BF1

Name _____ Period _____ Date _____

Find an algebraic expression for $h(x)$ using the given functions. Simplify if possible. Determine the domain, in interval notation, for each a , b , c , and d .

1. $f(x) = 2x + 1$ and $g(x) = -x^2$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

d. $h(x) = \left(\frac{f}{g}\right)(x)$

2. $f(x) = 3x + 4$ and $g(x) = 2x - 3$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

d. $h(x) = \left(\frac{f}{g}\right)(x)$

3. $f(x) = x^2 + 3x - 4$ and $g(x) = 2x + 1$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

4. $f(x) = \frac{1}{x} + 1$ and $g(x) = 4x$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

d. $h(x) = \left(\frac{f}{g}\right)(x)$

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5. $f(x) = \frac{2x+3}{3x-2}$ **and** $g(x) = \frac{4x}{3x-2}$

6. $f(x) = x^3$ **and** $g(x) = x + 2$

a. $h(x) = (f + g)(x)$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

c. $h(x) = (fg)(x)$

d. $h(x) = \left(\frac{f}{g}\right)(x)$

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7. $f(x) = (x + 3)^2$ **and** $g(x) = \sqrt{x} - 3$

8. $f(x) = \sqrt{2x}$ **and** $g(x) = \cos x$

a. $h(x) = (f + g)(x)$

a. $h(x) = (f + g)(x)$

b. $h(x) = (f - g)(x)$

b. $h(x) = (f - g)(x)$

c. $h(x) = (fg)(x)$

c. $h(x) = (fg)(x)$

$$d. h(x) = \left(\frac{f}{g}\right)(x)$$

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Evaluate each of the following using the given function. **SHOW WORK!**

$$\text{Let } f(x) = 2x - 1, \quad g(x) = \sqrt{x + 5}, \quad \text{and} \quad h(x) = \frac{x}{x - 3}$$

$$9. f(1) - g(4)$$

$$10. 2f(-3) - f(5)$$

$$11. \frac{f(1)}{g(-1)}$$

$$12. g(4) \cdot h(6)$$

$$\text{Let } f(x) = x^2 + 2, \quad g(x) = 3\sqrt{x + 1}, \quad h(x) = 3^{(x-2)}, \quad \text{and} \quad k(x) = \frac{2x}{x-3}$$

$$13. \frac{f(-2)}{3g(0)}$$

$$14. h(\pi) - 4k(0)$$

$$15. f\left(\frac{\pi}{6}\right) + f(-3)$$

$$16. (f + g)(3)$$

$$17. (f - g)(4)$$

$$18. (f \cdot g)(2)$$

Find the indicated composition function and its domain, using the given functions. Show work!

$$19. f(x) = 3x + 2$$

$$g(x) = x - 1$$

$$a) h(x) = (f \circ g)(x)$$

$$b) h(x) = (g \circ f)(x)$$

$$c) h(x) = (f \circ f)(x)$$

$$d) h(x) = (g \circ g)(x)$$

Find the indicated composition function and its domain, using the given functions. Show work!

20. $f(x) = x^2 - 1$ $g(x) = \frac{1}{x-1}$

a) $h(x) = (f \circ g)(x)$

b) $h(x) = (g \circ f)(x)$

c) $h(x) = (f \circ f)(x)$

d) $h(x) = (g \circ g)(x)$

21. $f(x) = \frac{1}{x-1}$ $g(x) = \sqrt{x}$

a) $h(x) = (f \circ g)(x)$

b) $h(x) = (g \circ f)(x)$

c) $h(x) = (f \circ f)(x)$

d) $h(x) = (g \circ g)(x)$

22. $f(x) = |x-5| - 2$ $g(x) = -2\sin x$

a) $h(x) = (f \circ g)(x)$

b) $h(x) = (g \circ f)(x)$

c) $h(x) = (f \circ f)(x)$

d) $h(x) = (g \circ g)(x)$

Evaluate each composition function using the given functions.

$f(x) = 3x^2 - 1$

$g(x) = \sqrt{x - 1}$

$h(x) = \frac{x - 2}{x - 3}$

23. $(f \circ g)(1)$

24. $(g \circ f)(5)$

25. $(h \circ f)(4)$

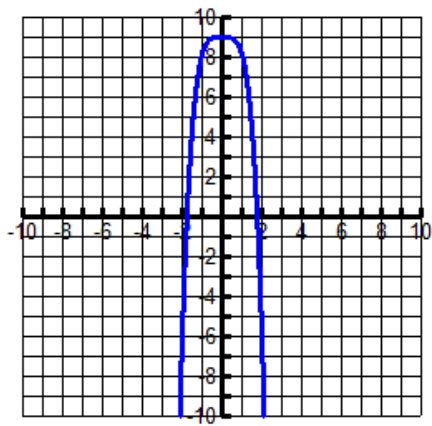
26. $(g \circ g)(26)$

27. $(f \circ f)(-1)$

28. $(h \circ h)(4)$

29. Which of the following functions has the highest maximum value?

Function 1



Function 2

$$h(x) = -(x + 2)^4 + 5$$

Function 3

x	f(x)
-10	6
-9	8
-8	10
-7	8
-6	6